2012

Feasibility Analysis of Greywater at WPI

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Abstract

- Address the issue of water sustainability on the campus of Worcester Polytechnic Institute.
- Propose a feasible water recycling system
- Assess the feasibility of implementing greywater systems in residential structures at WPI.
- Determine what place, if any, would be the most ideally suited for greywater implementation.

Background

- Greywater: water that after being slightly polluted by human activities can still be reused[3]
- Greywater systems reuse greywater for appropriate tasks like irrigation [6] [7] [12]
- Core issues:
  - Cost effectiveness/3 year payback [12]
  - Treatment systems/controlling contaminants[6][8]
  - Margin of greywater production and uses [2]
- Affected by regulations, cost, maintenance, health and public acceptance[6]

S.W.O.T.

Strengths:
- Reduces freshwater usage by large margins
- Simple principle and simple solution

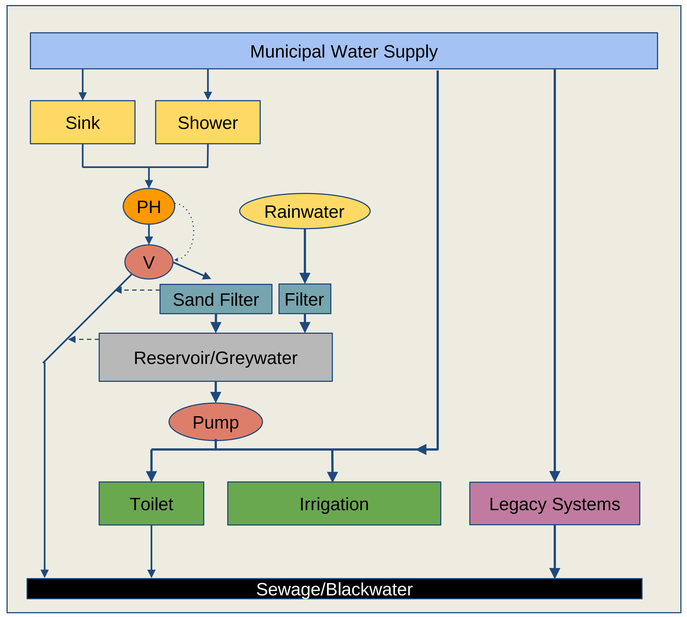
Weaknesses:
- High initial costs to implement [9] [10]
- Significant planning and new infrastructure [9] [10]

Opportunities:
- Save significant money on water bill
- Accolades for efforts in sustainability

Threats:
- Feasibility exists in water/plumbing markets [5] [6] [11]
- Government Regulations, health and safety [6]

Example of a Household Greywater Tank [4]

Proposed System Strategy



1)Reservoir to collect Greywater 2.) Input from Sink and Shower 3.) Input from Rainwater 4.) PH monitor 5.) Tank/Sewer Valve 6.) Sand Filter 7.) Supply for Irrigation 8.) Supply for Restroom [5] [6] [8] [11]

Statistics of Greywater

- A 450 person dorm uses 6750 Gal/day 15 Gal/person[1]
- 5400 Gallons is recyclable greywater[1]
- Valued at $37.8/day, $27,216 over 3 years at 0.7cents/gallon and 270 days[12]
- Greywater system will cost about same
- Enough water to irrigate 8000 square feet + flush toilets 600 times each day at 0.7 Gallons/Flush and 0.6 Gal/sq. ft.

Conclusions/Recommendations

- Greywater is not feasible for use at WPI unless it is part of the design of a new construction.
- Mainly infrastructure issues are the main impediments toward Greywater Implementation.
- Other, more traditional, water saving techniques would be best.
- Greywater would be a great plan, but only with a strong intention and foresight.

Acknowledgments

Thank you for Ryan Pollin and William Spratt for your time in helping us reach our conclusions through interviews and to our professors in guiding and preparing us for this presentation.

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